

## PATENT ABSTRACTS OF JAPAN

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(21)Application number : 11-127296

(71)Applicant : FUJI PHOTO FILM CO LTD

(22)Date of filing : 07.05.1999

(72)Inventor : SATO KENICHIRO  
KODAMA KUNIIHIKO  
AOSO TOSHIKI

## (54) POSITIVE TYPE RESIST COMPOSITION

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To make it possible to prevent the occurrence of development defects and to obtain excellent resist pattern profiles and the definition of contact holes by incorporating a resin which contains specific repeating units and is increased in a dissolution rate in an alkaline developer by the effect of an acid and a compound which generates the acid by irradiation with active rays or radiation into the above composition.

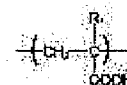
**SOLUTION:** This composition contains a resin which contains one kind of the repeating units of formula I and formula II, the repeating units of formula III, formula IV, etc., and is increased in a dissolution rate in the alkaline developer by the effect of the acid a compd. which generates the acid by irradiation with active rays or radiation. In the formulas I to IV, R1 denote hydrogen atoms or methyl groups; R2 denotes 1-4C alkyl group; R3, R4 denote hydrogen atoms, etc.; R5 to R12 denote hydrogen atoms or (substituted) alkyl groups; R denotes a hydrogen atom, etc.; (m) denotes an integer from 1 to 10; X denotes a single bond or bivalent groups, such as (substituted) alkylene group and cyclic alkylene group, which are alone or are combined and are not decomposed by the effect of the acid.



I



II

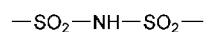
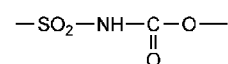
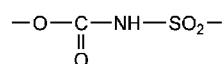
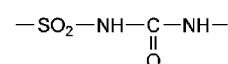
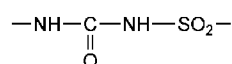
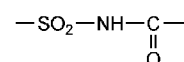
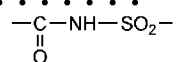
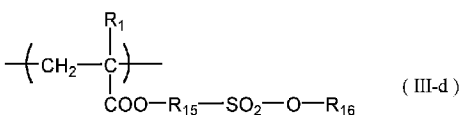
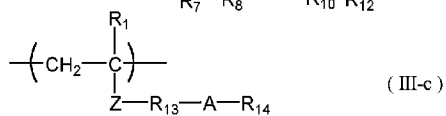
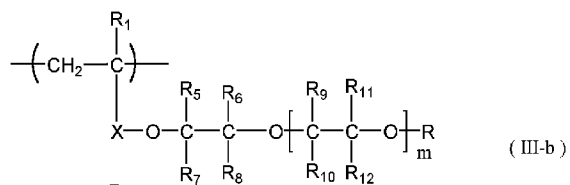
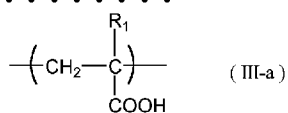
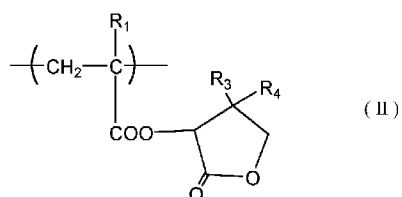
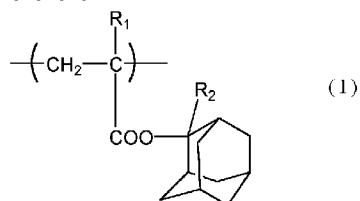


III



IV

A 10x10 grid of dots. A 5x5 square of dots in the top-left corner is enclosed by a dashed border. The dots are arranged in 10 rows and 10 columns. The first 5 rows and first 5 columns form the highlighted square.



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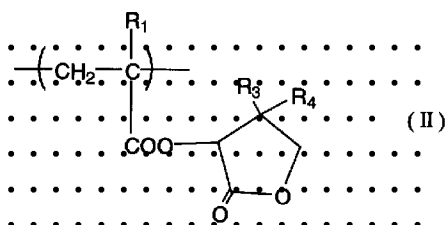
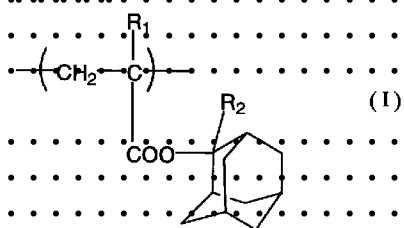
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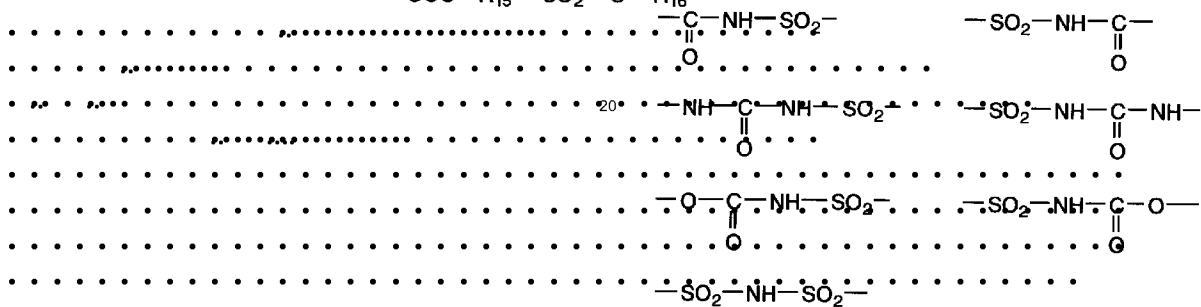
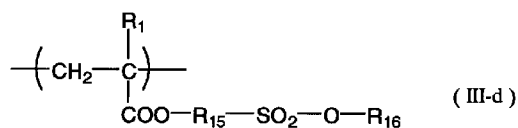
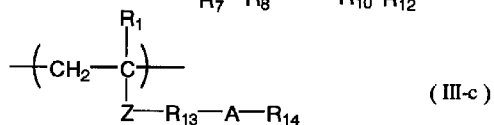
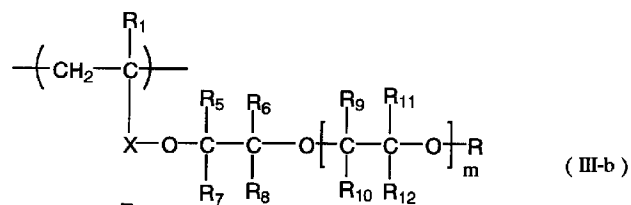
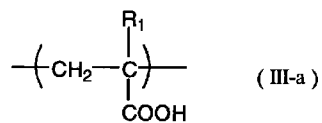
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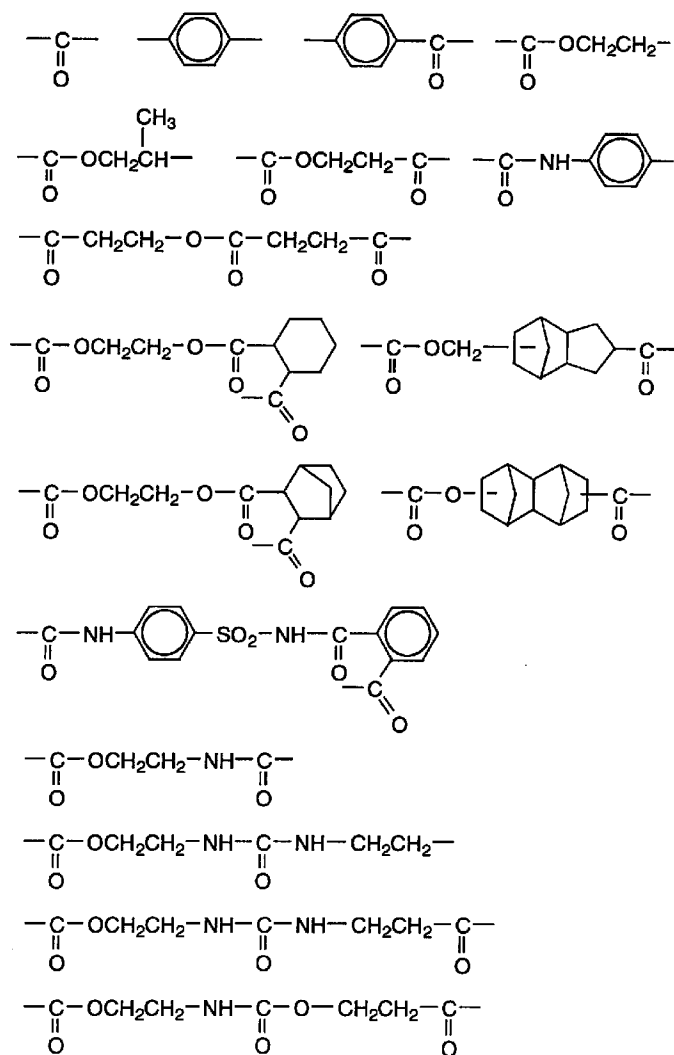
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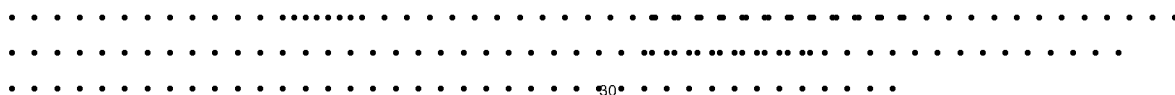


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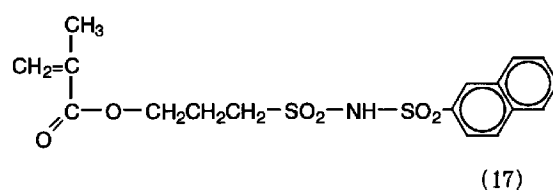
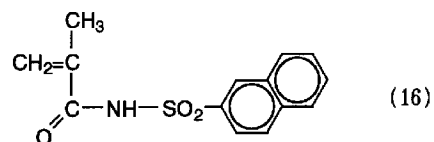
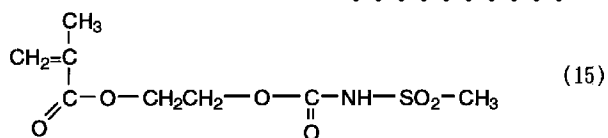
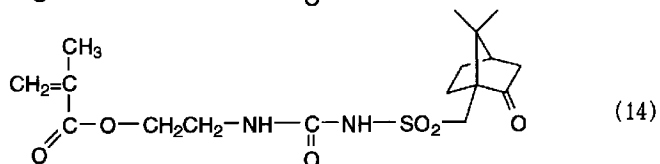
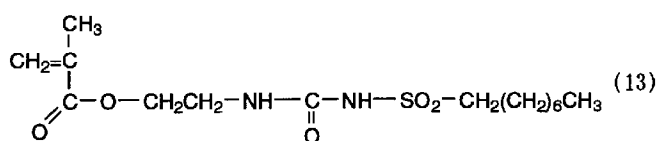
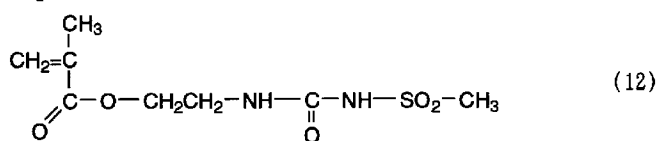
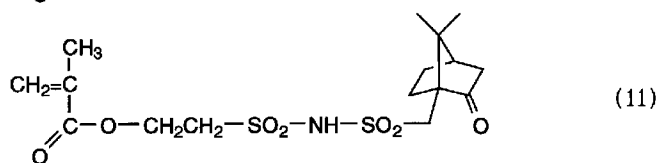
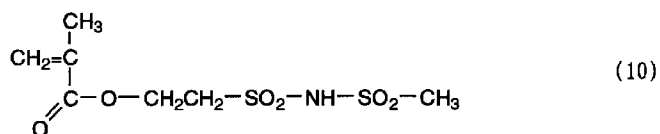
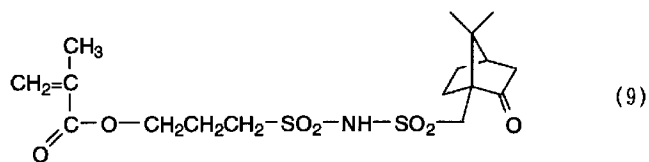
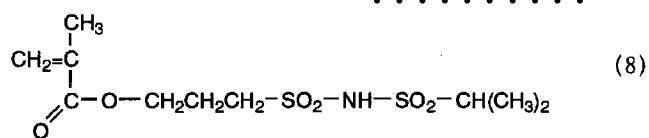
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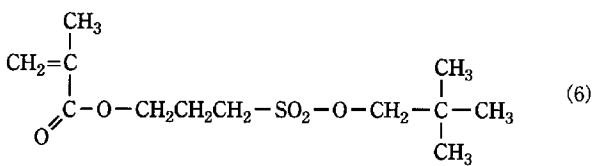
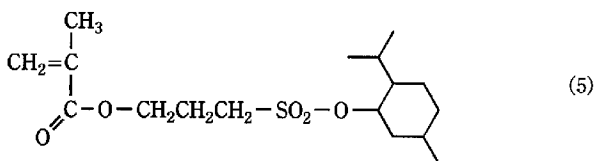
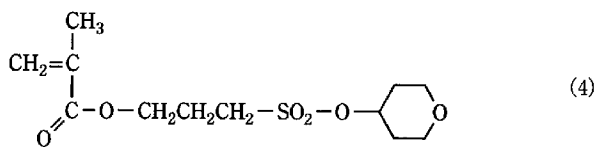
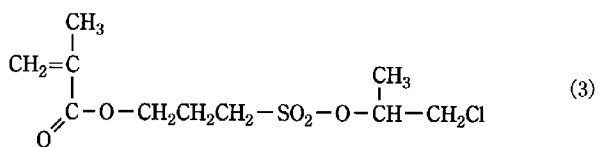
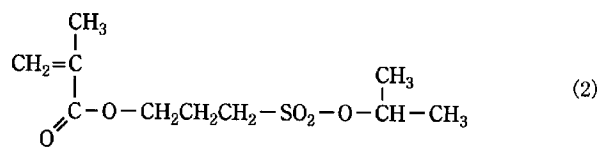
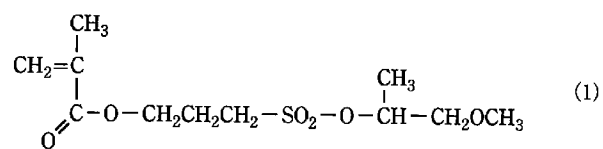




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$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_2=\text{C} \\ | \\ \text{O}=\text{C}-\text{O}-\text{CH}_2\text{CH}_2\text{CH}_2-\text{SO}_2-\text{O}-\text{CH}_2-\text{C}-\text{COOC}(\text{CH}_3)_3 \quad (7) \\ | \\ \text{CH}_3 \end{array}$$
$$\begin{array}{c}
 \text{CH}_3 \\
 | \\
 \text{CH}_2 = \text{C} \\
 | \\
 \text{O} = \text{C} - \text{O} - \text{CH}_2\text{CH}_2 - \text{SO}_2 - \text{O} - \text{CH}(\text{CH}_3) - \text{CH}_2\text{OCH}_3
 \end{array} \quad (8)$$
$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_2=\text{C} \\ | \\ \text{C}=\text{O}-\text{O}-\text{CH}_2\text{CH}_2-\text{SO}_2-\text{O}-\text{CH}(\text{CH}_3)-\text{CH}_3 \end{array} \quad (9)$$
$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_2=\text{C} \\ | \\ \text{O}=\text{C}-\text{O}-\text{CH}_2\text{CH}_2-\text{SO}_2-\text{O}-\text{CH}(\text{CH}_3)-\text{CH}_2\text{Cl} \end{array} \quad (10)$$
$$\text{CH}_2=\overset{\underset{\text{O}}{\parallel}}{\text{C}}(\text{CH}_3)-\text{O}-\text{CH}_2\text{CH}_2-\text{SO}_2-\text{O}-\text{C}_6\text{H}_4 \quad (11)$$
$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_2=\text{C} \\ | \\ \text{O}=\text{C}-\text{O}-\text{CH}_2\text{CH}_2-\text{SO}_2-\text{O}-\text{C}_6\text{H}_8\text{O} \end{array} \quad (12)$$
$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_2=\text{C} \\ | \\ \text{O}=\text{C}-\text{O}-\text{CH}_2\text{CH}_2\text{CH}_2-\text{SO}_2-\text{O}-\text{C}_6\text{H}_{10} \end{array} \quad (13)$$

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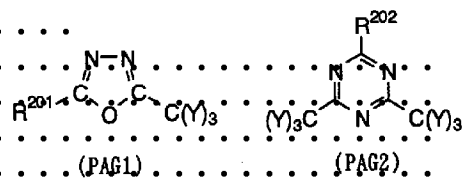
$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_2=\text{C} \\ | \\ \text{C}=\text{O}-\text{O}-\text{CH}_2\text{CH}_2\text{CH}_2-\text{SO}_2-\text{O}-\text{CH}_2-\text{C}-\text{CH}_3 \\ | \qquad \qquad \qquad | \\ \text{OH} \end{array} \quad (14)$$
$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_2=\text{C} \\ | \\ \text{O}=\text{C}-\text{O}-\text{CH}_2\text{CH}_2\text{CH}_2-\text{SO}_2-\text{O}-\text{C}_6\text{H}_4-\text{C}(=\text{O})\text{C}(\text{CH}_3)_2 \end{array} \quad (15)$$
$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_2=\text{C} \\ | \\ \text{O}=\text{C}-\text{O}-\text{CH}_2\text{CH}_2\text{CH}_2-\text{SO}_2-\text{O}-\text{C}_6\text{H}_3\text{O}_2 \end{array} \quad (16)$$
CC(=C)C(=O)OCCCS(=O)(=O)Oc1ccc2cc3ccccc3cc2c1=O (17)
$$\begin{array}{c} \text{H} \\ | \\ \text{CH}_2=\text{C} \\ | \\ \text{O}=\text{C}-\text{O}-\text{CH}_2\text{CH}_2\text{CH}_2-\text{SO}_2-\text{O}-\text{CH}(\text{CH}_3)-\text{CH}_2\text{OCH}_3 \end{array} \quad (18)$$
$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_2=\text{C} \\ | \\ \text{O}=\text{C}-\text{O}-\text{CH}_2\text{CH}_2\text{CH}_2-\text{SO}_2-\text{O}-\text{C}_6\text{H}_4\text{Cl} \end{array} \quad (19)$$

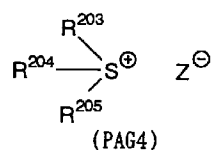
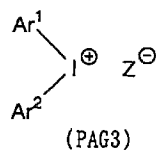
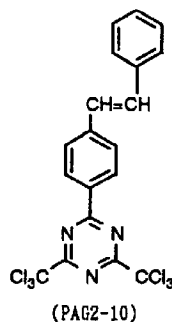
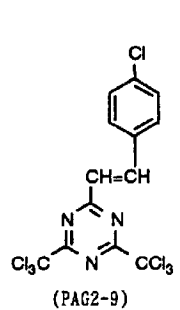
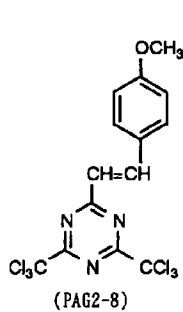
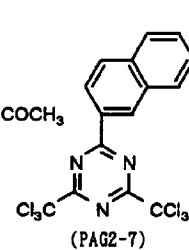
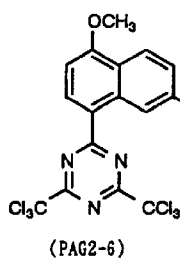
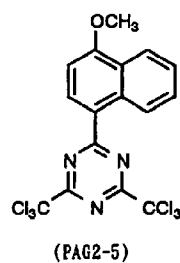
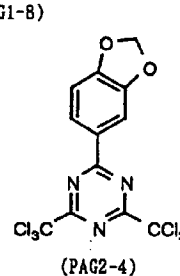
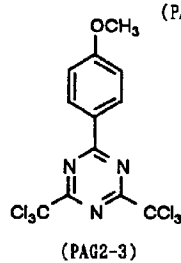
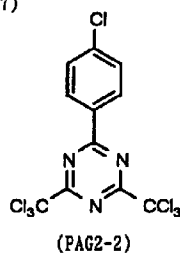
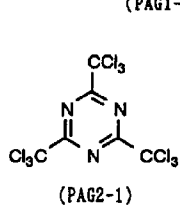
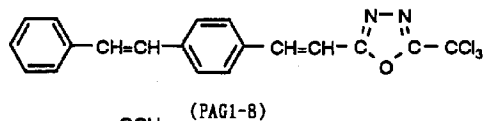
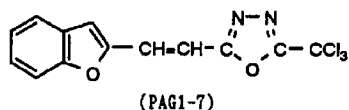
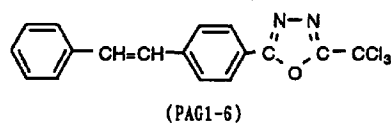
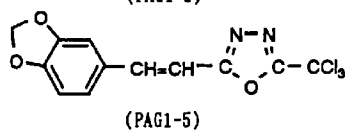
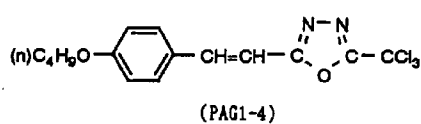
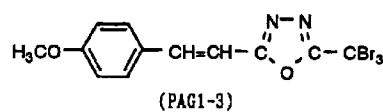
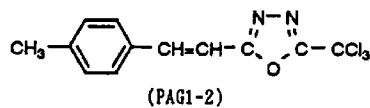
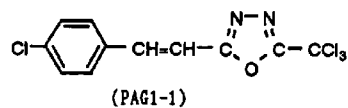
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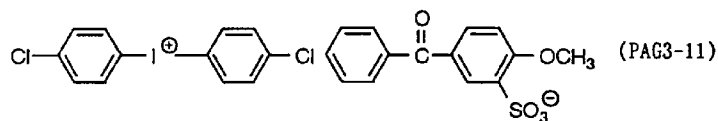
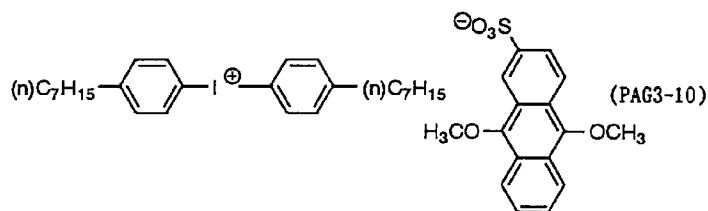
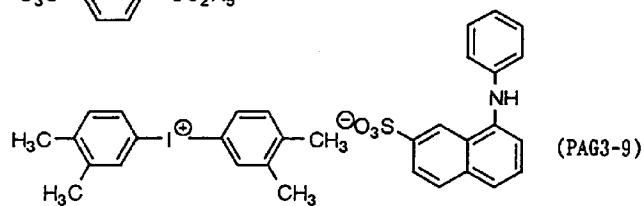
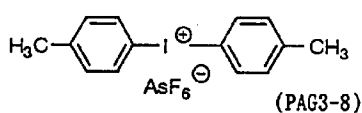
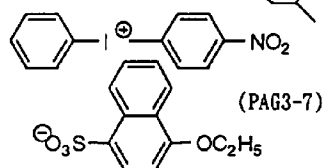
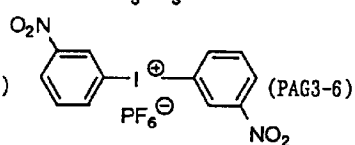
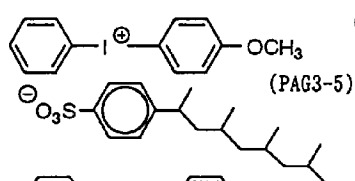
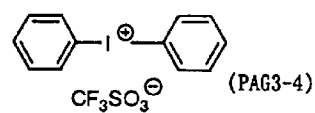
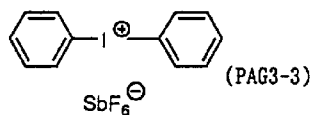
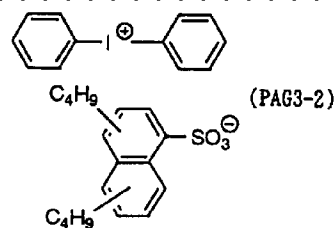
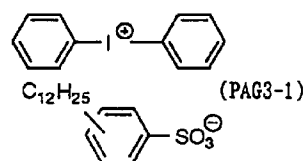
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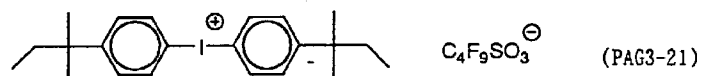
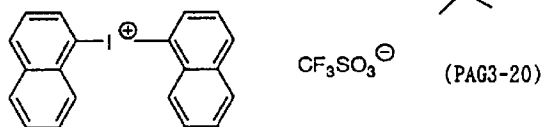
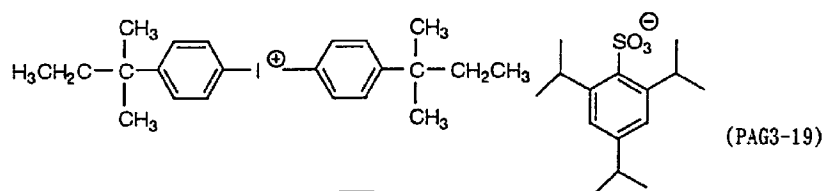
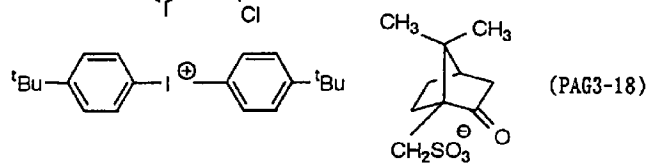
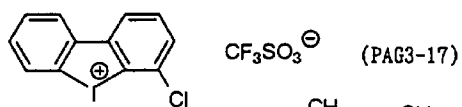
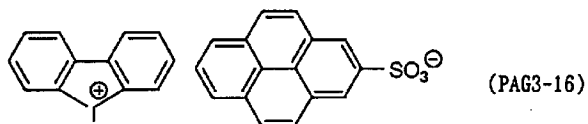
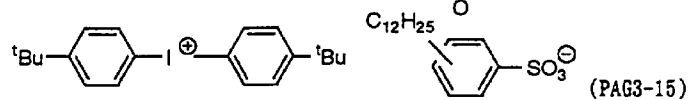
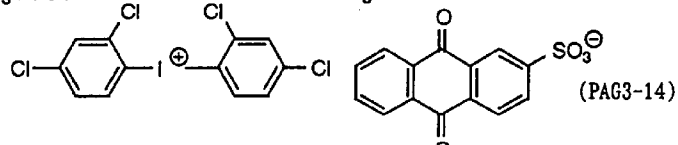
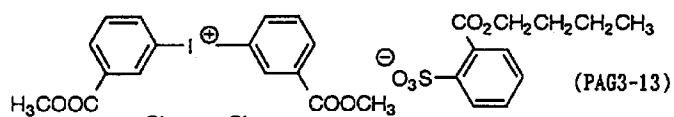
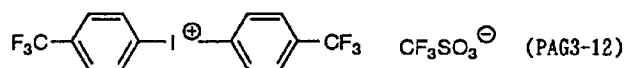






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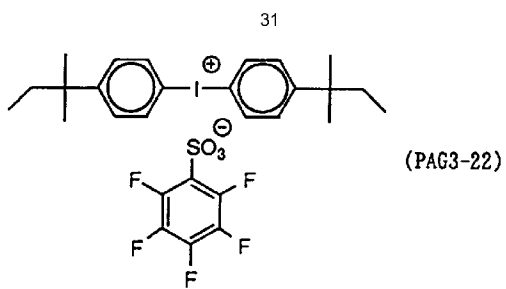
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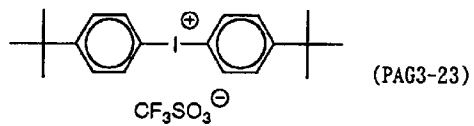
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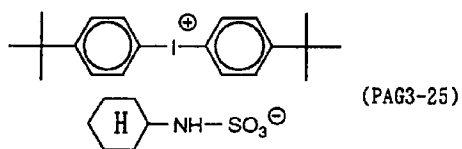
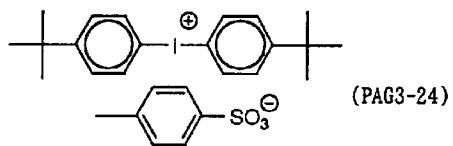


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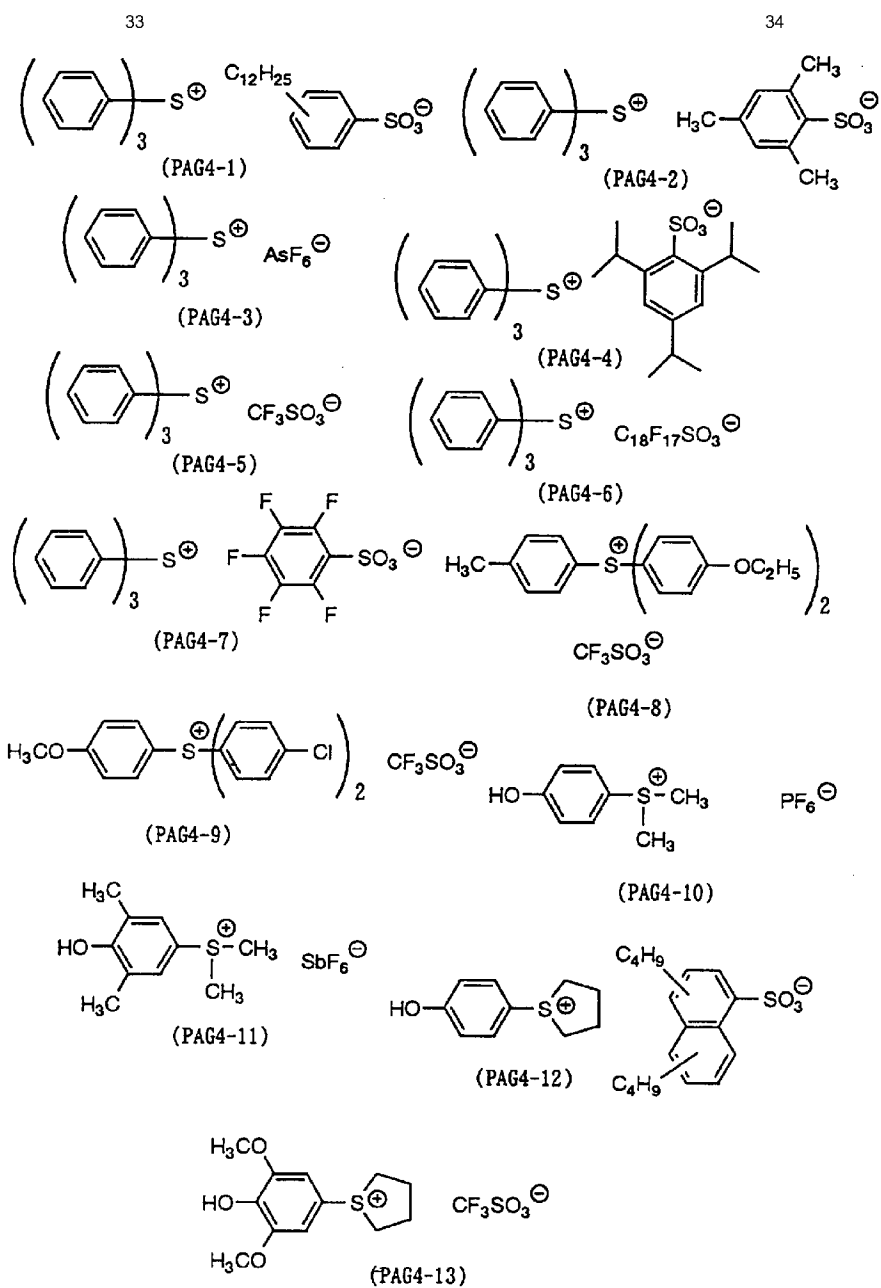


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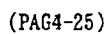
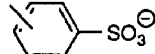
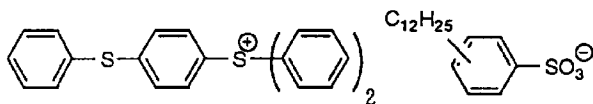
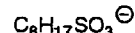
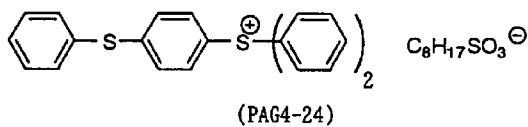
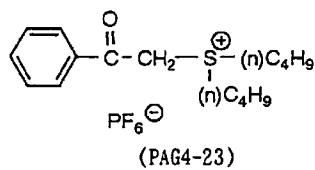
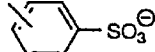
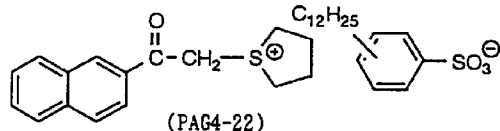
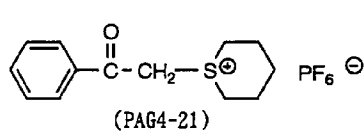
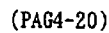
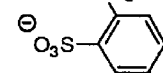
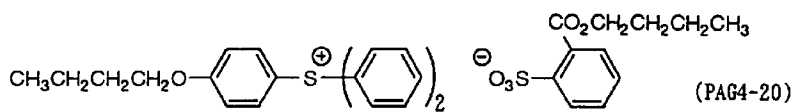
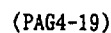
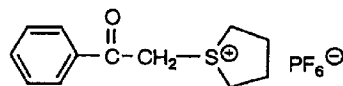
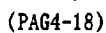
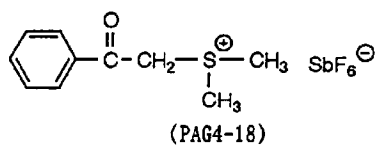
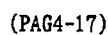
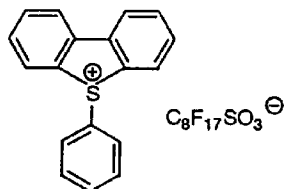
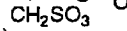
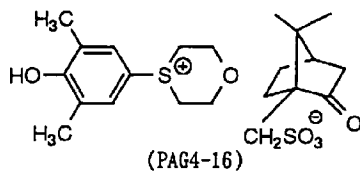
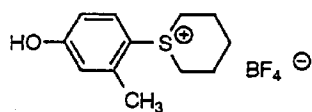
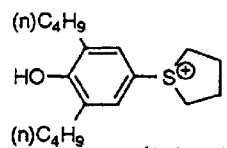
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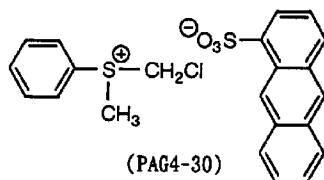
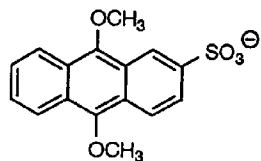
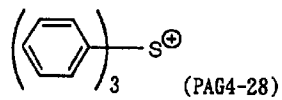
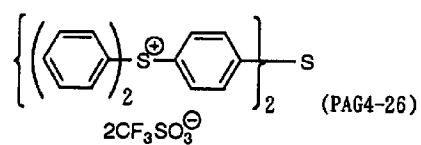
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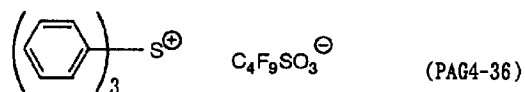
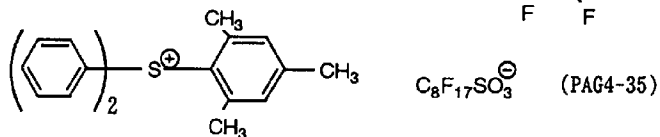
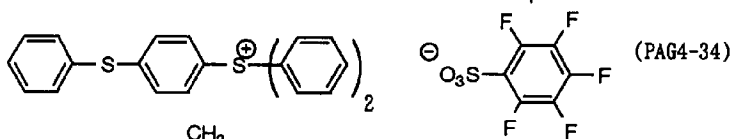
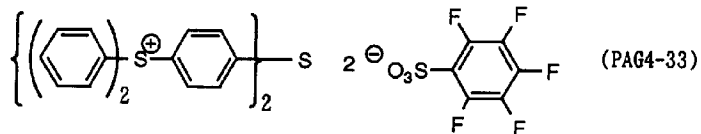
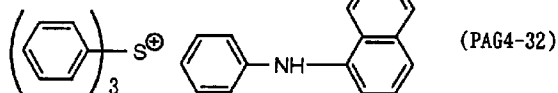
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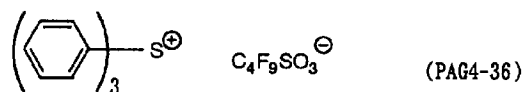
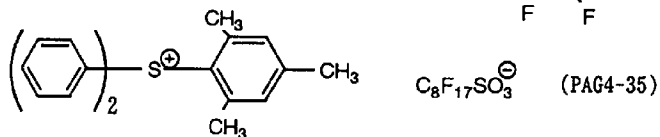
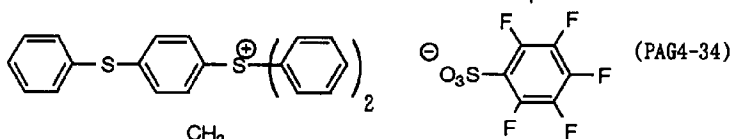
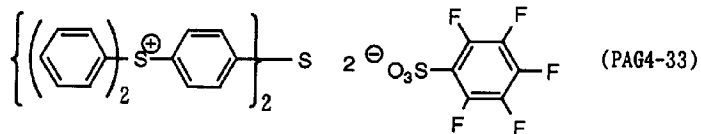
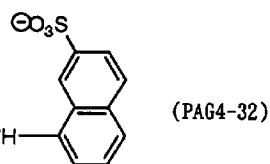
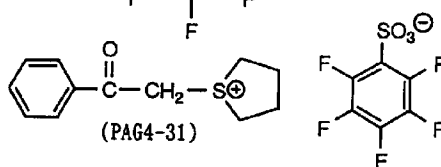
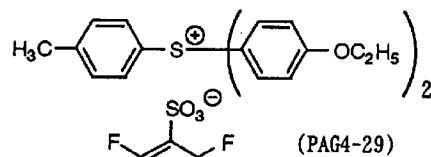
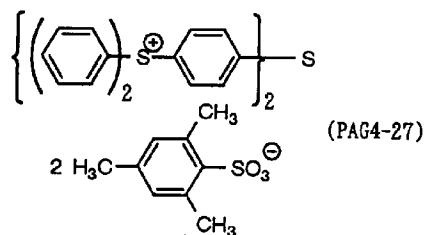
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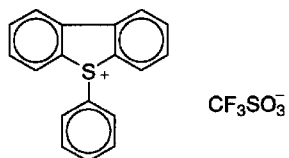
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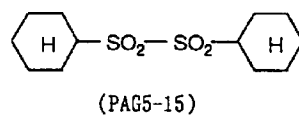
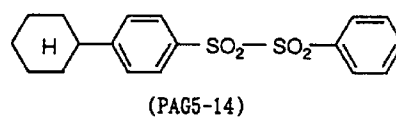
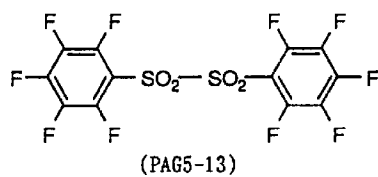
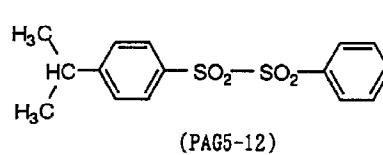
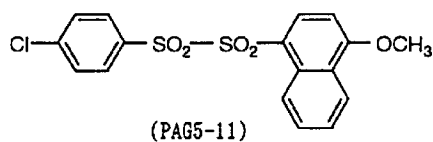
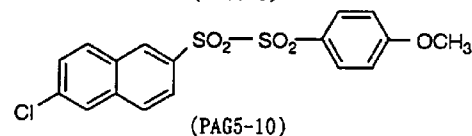
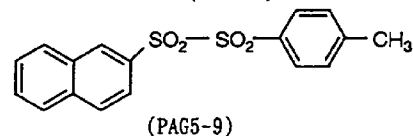
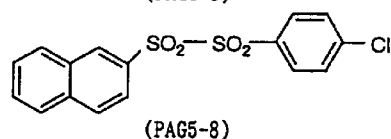
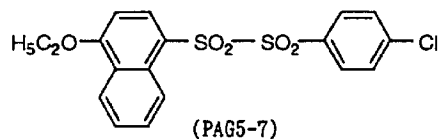
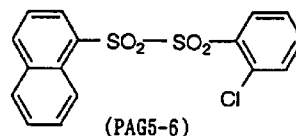
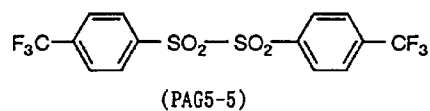
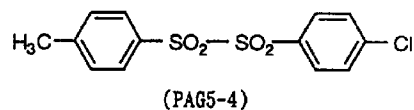
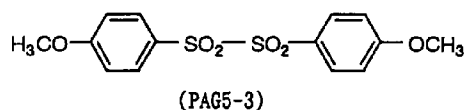
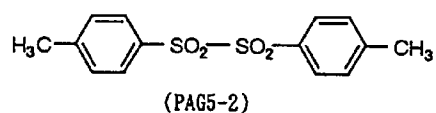
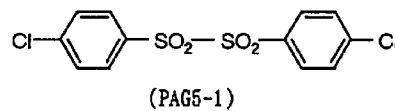
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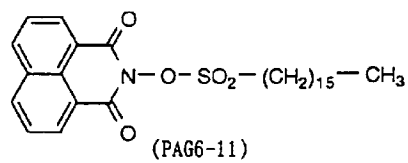
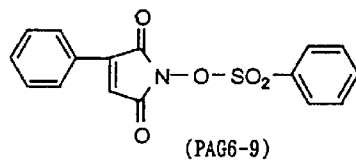
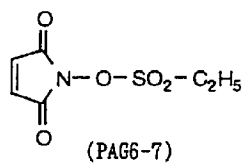
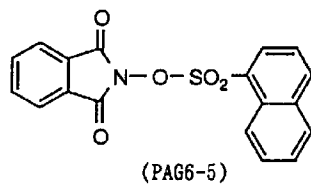
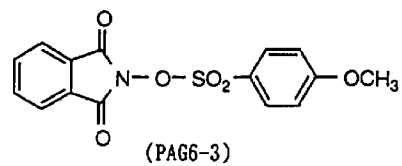
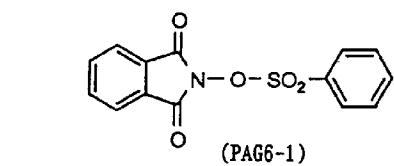
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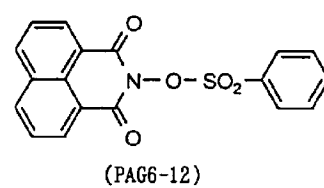
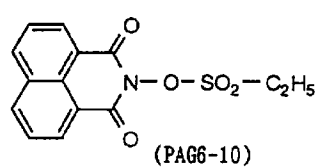
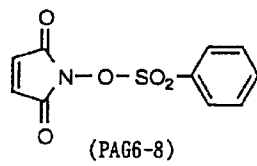
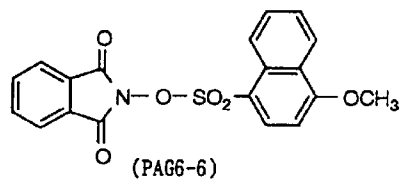
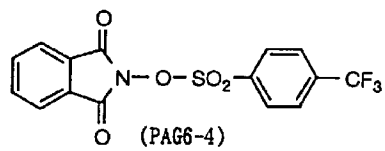
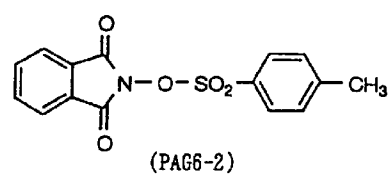
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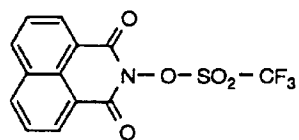
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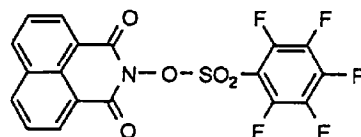
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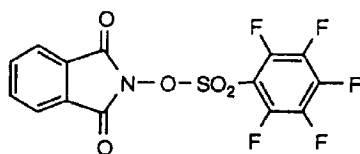


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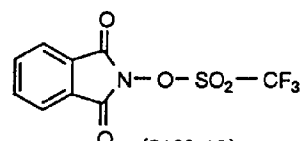
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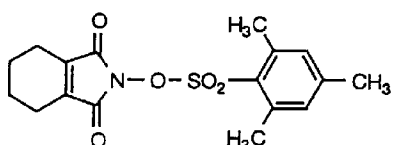
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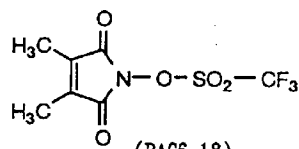
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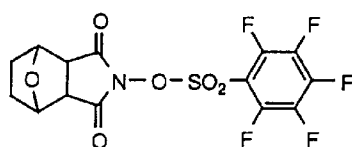
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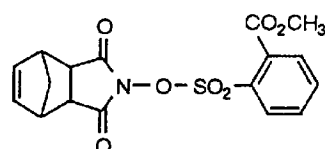
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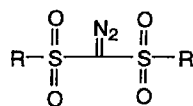
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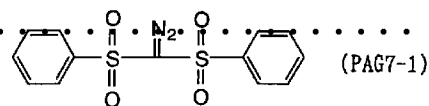
(PAG6-19)



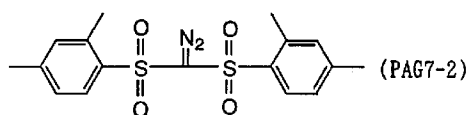
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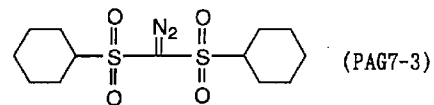
(PAG7)



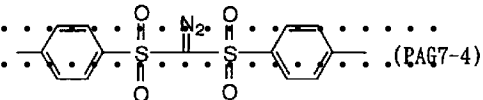
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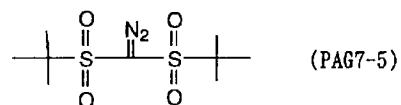
(PAG7-2)



(PAG7-3)



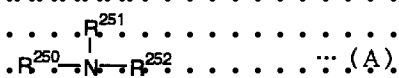
(PAG7-4)



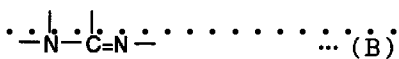
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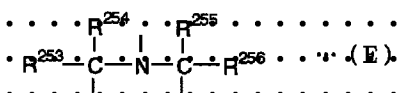
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This image shows a full page of dot grid paper. The dots are arranged in a precise, repeating pattern across the entire surface, forming a grid that can be used for writing, drawing, or planning. The dots are small and dark, set against a light background.

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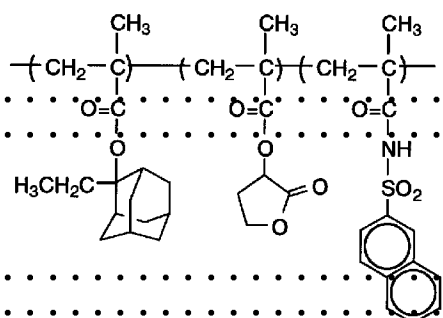
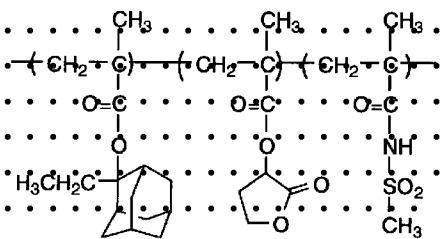
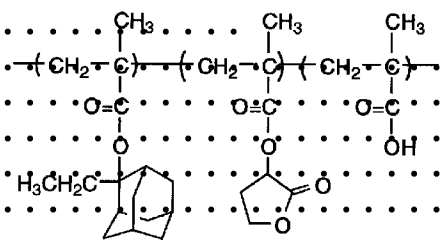
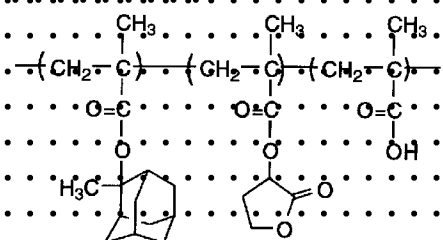
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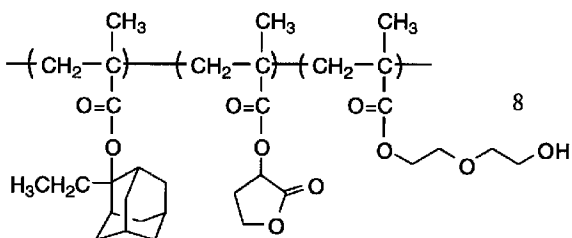
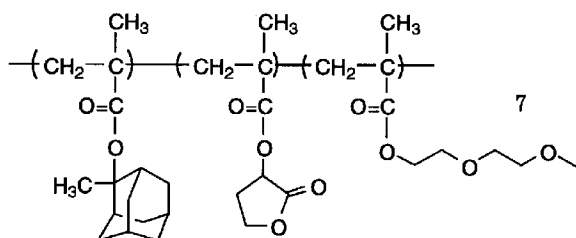
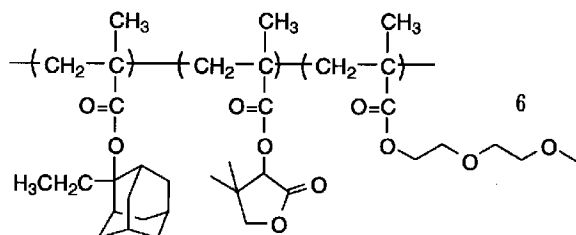
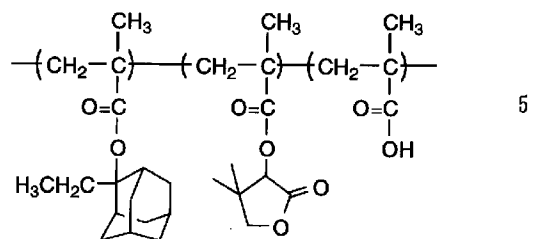
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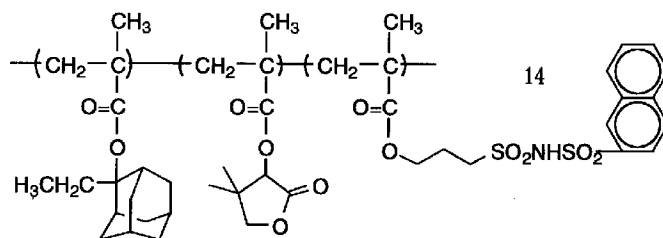
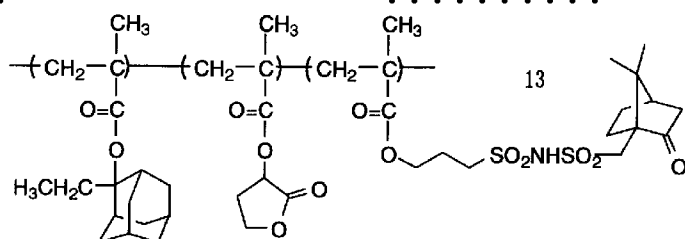
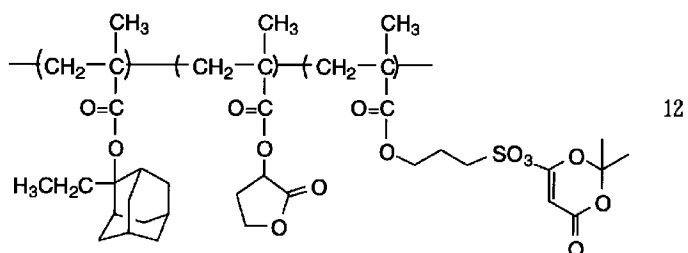
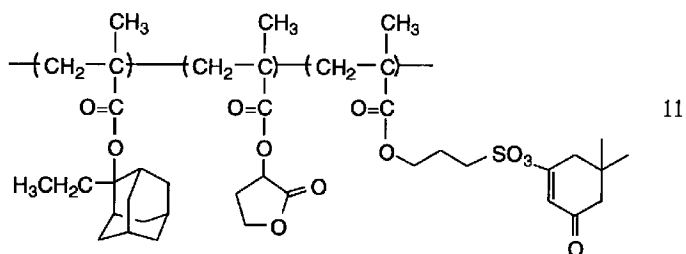
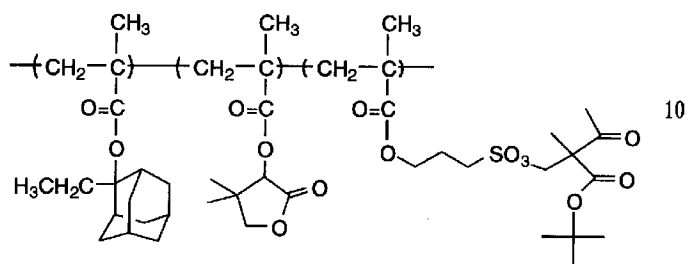
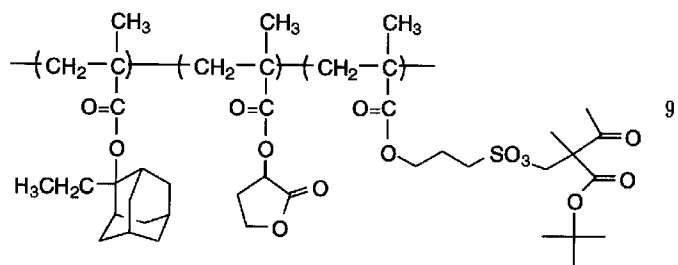
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No.	樹脂	光酸発生剤	アミン	パターンプロ ファイル	現像欠陥 数	コンタクトの 解像力( $\mu\text{m}$ )
実施例 1	1-1	PAG-1	2	○	60	0.21
実施例 2	1-3	PAG-2	1	○	70	0.21
実施例 3	2-1	PAG-3	1	○	60	0.22
実施例 4	2-2	PAG-1	1	○	80	0.22
実施例 5	3-1	PAG-1	1	○	70	0.21
実施例 6	3-2	PAG-3	2	○	90	0.21
実施例 7	4-1	PAG-1	1	○	80	0.22
実施例 8	4-2	PAG-1	1	○	60	0.22
実施例 9	5-1	PAG-2	1	○	70	0.21
実施例 10	5-2	PAG-1	1	○	90	0.22
実施例 11	5-3	PAG-3	1	○	80	0.21
実施例 12	6-1	PAG-2	1	○	90	0.22
実施例 13	6-2	PAG-2	1	○	80	0.22
実施例 14	7-1	PAG-1	2	○	80	0.22
実施例 15	7-2	PAG-3	1	○	90	0.22
実施例 16	8-1	PAG-2	1	○	80	0.22
実施例 17	8-2	PAG-2	1	○	80	0.22
実施例 18	9-1	PAG-3	1	○	50	0.20
実施例 19	9-2	PAG-2	2	○	50	0.20
実施例 20	9-3	PAG-2	1	○	50	0.20
実施例 21	10-1	PAG-1	1	○	50	0.20
実施例 22	10-2	PAG-2	1	○	50	0.20
実施例 23	11-1	PAG-2	1	○	45	0.20
実施例 24	11-2	PAG-2	1	○	45	0.20
実施例 25	12-1	PAG-3	1	○	45	0.20
実施例 26	12-2	PAG-2	1	○	45	0.20
実施例 27	13-1	PAG-1	1	○	80	0.22
実施例 28	13-2	PAG-3	2	○	90	0.22
実施例 29	14-1	PAG-1	1	○	80	0.22
実施例 30	14-2	PAG-1	1	○	90	0.22
比較例 1	R1	PAG-1	2	×	6000	0.25
比較例 2	R2	PAG-1	2	×	2000	0.24

No.	樹脂	光酸発生剤	W 剤	アミン	パターンプロフ アイル	現像欠陥 数	コンタクトの 解像力( $\mu\text{m}$ )
実施例 31	1-2	PAG-1	W-1	1	○	50	0.20
実施例 32	1-3	PAG-3	W-2	2	○	50	0.20
実施例 33	2-1	PAG-3	W-3	1	○	45	0.20
実施例 34	2-2	PAG-1	W-4	1	○	75	0.22
実施例 35	3-1	PAG-3	W-1	2	○	50	0.20
実施例 36	3-2	PAG-3	W-2	1	○	60	0.20
実施例 37	4-1	PAG-1	W-3	1	○	50	0.20
実施例 38	4-2	PAG-3	W-4	1	○	60	0.22
実施例 39	5-1	PAG-3	W-2	1	○	55	0.20
実施例 40	5-2	PAG-1	W-3	1	○	60	0.20
実施例 41	5-3	PAG-3	W-1	2	○	50	0.20
実施例 42	6-1	PAG-3	W-2	1	○	50	0.20
実施例 43	6-2	PAG-3	W-3	1	○	45	0.20
実施例 44	7-1	PAG-1	W-4	1	○	75	0.22
実施例 45	7-2	PAG-2	W-1	1	○	55	0.20
実施例 46	8-1	PAG-3	W-2	2	○	50	0.20
実施例 47	8-2	PAG-2	W-3	1	○	50	0.20
実施例 48	9-1	PAG-1	W-1	1	○	30	0.19
実施例 49	9-2	PAG-3	W-2	1	○	30	0.19
実施例 50	9-3	PAG-2	W-4	1	○	30	0.20
実施例 51	10-1	PAG-3	W-1	1	○	30	0.19
実施例 52	10-2	PAG-3	W-2	2	○	30	0.19
実施例 53	11-1	PAG-2	W-3	1	○	25	0.19
実施例 54	11-2	PAG-2	W-4	1	○	35	0.19
実施例 55	12-1	PAG-2	W-1	1	○	25	0.19
実施例 56	12-2	PAG-1	W-4	1	○	35	0.20
実施例 57	13-1	PAG-1	W-2	2	○	55	0.20
実施例 58	13-2	PAG-2	W-3	1	○	50	0.20
実施例 59	14-1	PAG-2	W-1	1	○	55	0.20
実施例 60	14-2	PAG-2	W-1	1	○	50	0.21
比較例 3	R1	PAG-1	W-1	1	×	4000	0.24
比較例 4	R2	PAG-1	W-1	1	×	1800	0.23



[illegible]